

1 **Amendment to the Claims**

2 **In the Claims:**

3 Please cancel Claims 17, 19 and 20.

4 Please amend Claims 1, 3-16, and 21-28, and add new Claims 29-45, as follows:

5 1. (Currently Amended) A device configured to collect airborne particles, comprising:

6 a regenerable collection surface for supporting a spot of immobilized airborne
7 particles, ~~wherein the collection surface is a regenerative surface;~~

8 a surface regenerator configured to remove particles from the regenerable collection
9 surface, such that once regenerated, the regenerable collection surface can collect additional particles
10 from the air, and such that particles collected before the regeneration are substantially no longer
11 present to contaminate particles collected after the regeneration; and

12 ~~at least one~~ a detector capable of sensing a biological signature in the spot.

13 2. (Cancelled)

14 3. (Currently Amended) The device according to ~~claim 1~~, ~~wherein the detector generates~~
15 ~~electrical signals, and further comprising a receiver coupled to the detector for receiving the electrical~~
16 ~~signals~~ Claim 1, further comprising a spotting nozzle configured to direct an air stream towards the
17 regenerable collection surface, such that a resulting impact of the air stream with the regenerable
18 collection surface produces a spot of particles on the regenerable collection surface.

19 4. (Currently Amended) The device according to ~~claim 1~~, ~~further comprising an inertial~~
20 ~~impactor for immobilizing the spot of airborne particles on the regenerative collection surface~~
21 Claim 1, wherein the regenerable collection surface is part of an impaction plate.

22 5. (Currently Amended) The device according to ~~claim 1~~ Claim 1, wherein the detector is
23 selected from the group consisting of a fluorescence detector, a Raman spectrometer, a Fourier
24 transform infrared spectrometer, and a MALDI mass spectrometer.

25 6. (Currently Amended) The device according to ~~claim 5~~ Claim 1, wherein the detector is a
26 fluorescence detector ~~capable of emitting excitatory radiation of wavelengths operative to excite~~
27 ~~biomolecules, further comprising an excitation light source configured to emit excitatory radiation~~
28 that is directed towards the particles collected upon the regenerable collection surface, the excitatory
29 radiation having a wavelength that excites any biomolecules comprising the particles to produce a
30 fluorescence radiation to which the fluorescence detector responds.

7. (Currently Amended) The device according to ~~claim 4~~ Claim 1, wherein the biological signature is selected from the group consisting of an autofluorescence, a Raman spectrum, an infrared absorption spectrum, and a mass spectrum.

8. (Currently Amended) A device comprising:

a regenerative regenerable collection surface configured for supporting a spot of immobilized airborne particles;

a surface regenerator configured to remove particles from the regenerable collection surface to regenerate the regenerable collection surface, such that once thus regenerated, the regenerable collection surface can collect additional particles from the air, and such that particles collected before the regenerable collection surface was regenerated are substantially no longer present to contaminate particles collected after the regenerable collection surface was regenerated;

an excitation light source for emitting excitatory radiation towards the spot, the excitatory radiation having a wavelength operative to excite biomolecules to produce fluorescence; and

a fluorescence photosensor for measuring fluorescence radiation emitted from the spot.

9. (Currently Amended) The device according to ~~claim 8~~ Claim 8, wherein the excitatory radiation is substantially ultraviolet, and the fluorescence radiation is substantially visible.

10. (Currently Amended) The device according to ~~claim 8~~ wherein the excitation light source is a LED Claim 8, wherein the surface regenerator comprises at least one element selected from the group consisting essentially of:

(a) a brush that regenerates the regenerable collection surface by brushing away particles that were collected on the regenerable collection surface;

(b) a pad that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the pad and the regenerable collection surface move relative to each other, so as to remove particles that were collected on the regenerable collection surface; and

(c) a wheel coupled to a motor that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the motor rotates the wheel, so as to remove particles that were collected on the regenerable collection surface.

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11. (Currently Amended) The device according to ~~claim 10 wherein the wavelength~~
~~operative to excite biomolecules is within a 340-370 nm range~~ Claim 8, wherein the surface
regenerator comprises at least one element selected from the group consisting essentially of:

(a) a nozzle configured to direct a stream of high velocity air towards the
regenerable collection surface to dislodge particles deposited thereon;

(b) a blade configured to scrape the regenerable collection surface to dislodge
particles deposited thereon;

(c) means for electrostatically charging the collection surface, so that a static
charge disperses the particles that were deposited thereon;

(d) means for directing energy to the particles collected upon the regenerable
collection surface to dislodge particles deposited thereon; and

(e) means for directing energy to the regenerable collection surface to dislodge
particles deposited thereon.

12. (Currently Amended) The device according to ~~claim 8 wherein the wavelength operative~~
~~to excite biomolecules is of approximately 266 nm~~ Claim 8, further comprising a processor
configured to implement at least one function selected from the group consisting essentially of:

(a) producing an alarm signal if a signal from the fluorescence photosensor
indicates that the particles collected on the regenerable collection surface are potentially harmful to
biological organisms; and

(b) activating at least one additional component if the signal from the fluorescence
photosensor indicates that the particles collected on the regenerable collection surface are potentially
harmful to biological organisms.

13. (Currently Amended) The device according to ~~claim 8 wherein the wavelength operative~~
~~to excite biomolecules is of approximately 400 nm~~ Claim 8, further comprising a liquid coating
applicator configured to moisten the regenerable collection surface prior to collecting the particles,
thereby enhancing a particle collection efficiency of the regenerable collection surface.

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14. (Currently Amended) The device according to ~~claim 8~~ wherein the fluorescence photosensor is a photodiode Claim 8, further comprising a processor coupled to the fluorescence photosensor, the processor being logically configured to determine a concentration of biological particles collected on the regenerable collection surface, and to activate an alarm signal if the processor determines that the concentration of biological particles on the regenerable collection surface exceeds a predetermined value.

15. (Currently Amended) The device according to ~~claim 8~~ Claim 8, further comprising a dichroic mirror that substantially reflects excitatory radiation and is substantially transparent to fluorescence radiation, the dichroic mirror being positioned to reflect the excitatory radiation towards the spot.

16. (Currently Amended) The device according to ~~claim 15~~ Claim 15, further comprising at least one element selected from the group consisting essentially of an excitation filter positioned between the excitation light source and the dichroic mirror, and an emission filter positioned between the dichroic mirror and the fluorescence photosensor.

17-20. (Cancelled)

21. (Currently Amended) A method of detecting airborne biological particles, the method comprising:

depositing airborne particles on a regenerable collection surface provided for supporting a spot of immobilized airborne particles, ~~wherein the collection surface is a regenerable surface~~, such that the ~~deposited~~ particles deposited on the regenerable collection surface form a spot;

measuring a biological signature present in the particles comprising the spot, using a detector ~~capable of~~ configured for sensing the biological signature ~~in the spot of the particles~~;

determining a concentration of the immobilized airborne biological particles from the measurement of the biological signature; and

regenerating the regenerable collection surface by removing particles from the regenerable collection surface, such that once thus regenerated, the regenerable collection surface can collect additional particles from the air, and such that particles collected before a regeneration of the regenerable surface are substantially no longer present to contaminate particles collected after the regeneration.

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22. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein ~~the step of~~
depositing ~~is by results from an~~ inertial impaction ~~of the particles on the regenerable collection~~
surface.

23. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein the
biological signature is an autofluorescence.

24. (Currently Amended) The method according to ~~claim 21~~ Claim 21, wherein the
biological signature is selected from the group consisting of an autofluorescence, a Raman spectrum,
an infrared absorption spectrum, and a mass spectrum.

25. (Currently Amended) A method of continuous monitoring ~~of~~ to detect airborne
biological particles, ~~the method comprising during~~ a plurality of cycles, each cycle comprising the
steps of:

depositing airborne particles on a ~~regenerative~~ regenerable collection surface
configured for supporting a spot of immobilized airborne particles to form a spot;

exciting ~~the~~ biomolecules comprising the biological particles to produce fluorescence
with an excitation light source ~~for emitting that emits an~~ excitatory radiation towards the spot, the
excitatory radiation having a wavelength operative to excite the biomolecules to produce
fluorescence;

measuring an autofluorescence of the biomolecules in the particles forming the spot
with a fluorescence photosensor ~~for measuring fluorescence radiation emitted from the spot~~;

determining a present value of a concentration of airborne biological particles from the
measurement of the autofluorescence; and

regenerating the regenerable collection surface by removing particles from the
regenerable collection surface, such that once thus regenerated, the regenerable collection surface can
collect additional particles from air, and such that particles collected before a regeneration of the
regenerable collection surface are substantially no longer present to contaminate particles collected
after the regeneration.

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26. (Currently Amended) The method according to ~~claim 25~~ Claim 25, further comprising the steps of:

calculating an average value and a standard deviation from a defined number of prior present values obtained in ~~the defined~~ a corresponding number of preceding cycles;

comparing the present value to the average value; and

~~outputting~~ producing an alarm signal if the present value exceeds a total of the average value ~~plus~~ and a product, wherein the product is equal to a preset factor multiplied by the standard deviation.

27. (Currently Amended) The method according to ~~claim 26~~ Claim 26, wherein the defined number is eight.

28. (Currently Amended) The method according to ~~claim 26~~ Claim 26, wherein the preset factor is between about 3 and about 5.

29. (New) The device according to Claim 6, further comprising a dichroic mirror that substantially reflects the excitatory radiation and is substantially transparent to the fluorescence radiation emitted by the excited biomolecules, the dichroic mirror being positioned to reflect the excitatory radiation towards the particles deposited upon the regenerable collection surface.

30 (New) The device according to Claim 29, further comprising at least one element selected from the group consisting essentially of:

(a) an excitation filter disposed between the excitation light source and the dichroic mirror; and

(b) an emission filter disposed between the dichroic mirror and the fluorescence detector.

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31. (New) The device according to Claim 1, wherein the surface regenerator comprises at least one element selected from the group consisting essentially of:

(a) a brush that regenerates the regenerable collection surface by brushing away particles that were collected on the regenerable collection surface;

(b) a pad that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the pad and the regenerable collection surface move relative to each other, so as to remove particles that were collected on the regenerable collection surface; and

(c) a wheel coupled to a motor that regenerates the regenerable collection surface by pressing against the regenerable collection surface while the motor rotates the wheel, so as to remove particles that were collected on the regenerable collection surface.

32. (New) The device of Claim 1, wherein the surface regenerator comprises at least one element selected from the group consisting essentially of:

(a) a nozzle configured to direct a stream of high velocity air towards the regenerable collection surface to dislodge particles deposited thereon;

(b) a blade configured to scrape the regenerable collection surface to dislodge particles deposited thereon;

(c) means for electrostatically charging the regenerable collection surface, so that a static charge disperses the particles that were deposited thereon;

(d) means for directing energy to the particles collected upon the regenerable collection surface to dislodge particles deposited thereon; and

(e) means for directing energy to the regenerable collection surface to dislodge particles deposited thereon.

33. (New) The device of Claim 1, further comprising a liquid coating applicator configured to moisten the regenerable collection surface prior to collecting the particles, thereby enhancing a collection efficiency of the regenerable collection surface.

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34. (New) The device of Claim 1, further comprising a mechanical homing sensor that positions the regenerable collection surface relative to at least one additional component selected from the group consisting essentially of:

- (a) a spotting nozzle configured to deposit a spot of particles on the regenerable collection surface;
- (b) the detector;
- (c) the surface regenerator; and
- (d) a liquid coating applicator used to apply a liquid to the regenerable collection surface.

35. (New) The device of Claim 1, further comprising a processor configured to implement at least one function selected from the group consisting essentially of:

- (a) producing an alarm signal if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms;
- (b) activating at least one additional component if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms; and
- (c) determine a concentration of biological particles collected on the regenerable collection surface, and to activate an alarm signal if the processor determines that the concentration of biological particles on the regenerable collection surface exceeds a predetermined value.

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36. (New) The apparatus of Claim 1, further comprising a processor coupled to the detector, the processor being logically configured to implement at least one function selected from the group consisting essentially of:

(a) determine a concentration of particles collected on the regenerable collection surface, and to activate an air sampler to obtain a sample of particles from the same general volume of air that provided the particles originally deposited on the regenerable collection surface;

(b) activating an air sampler to obtain a sample of particles from the same general volume of air that provided the particles originally deposited on the regenerable collection surface, if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms;

(c) determine a concentration of particles collected on the regenerable collection surface, and to activate an analysis device to collect and analyze a sample particles from the same general volume of air that provided the particles originally deposited on the regenerable collection surface; and

(d) activating an air analysis device to obtain and analyze a sample of particles from the same general volume of air that provided the particles originally deposited on the regenerable collection surface, if the detector indicates that the particles collected on the regenerable collection surface are potentially harmful to biological organisms.

37. (New) The method of Claim 21, further comprising the steps of:

(a) comparing the concentration of immobilized airborne biological particles against predetermined criteria indicative of a potential alarm condition; and

(b) if the concentration of immobilized airborne biological particles equals or exceeds the predetermined criteria, responding by implementing at least one step selected from the group of steps consisting essentially of:

- (i) activating an alarm signal directed to alert a designated party;
- (ii) manipulating an air management component;
- (iii) producing a warning signal;
- (iv) activating an air sampler to collect a sample of particles from the same general area that provided the airborne particles deposited on the regenerable collection surface; and
- (v) moving a damper in an air duct.

38. (New) The method of Claim 21, wherein the step of regenerating the collection surface comprises at least one step selected from the group of steps consisting essentially of:

(a) brushing the regenerable collection surface, to dislodge the particles deposited on the regenerable collection surface;

(b) pressing a pad against the regenerable collection surface while there is relative motion between the pad and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(c) pressing a wheel against the regenerable collection surface while there is relative motion between the wheel and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(d) directing a stream of high velocity air towards the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface;

(e) electrostatically charging the regenerable collection surface to electrostatically disperse the particles deposited on the regenerable collection surface; and

(f) directing energy to the particles collected upon the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface.

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39. (New) The method of Claim 25, wherein the step of regenerating the regenerable collection surface comprises at least one step selected from the group of steps consisting essentially of:

(a) brushing the regenerable collection surface, to dislodge the particles deposited on the regenerable collection surface;

(b) pressing a pad against the regenerable collection surface while there is relative motion between the pad and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(c) pressing a wheel against the regenerable collection surface while there is relative motion between the wheel and the regenerable collection surface, to remove the particles deposited on the regenerable collection surface;

(d) directing a stream of high velocity air towards the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface;

(e) electrostatically charging the regenerable collection surface to electrostatically disperse the particles deposited on the regenerable collection surface; and

(f) directing energy to the particles collected upon the regenerable collection surface to dislodge the particles deposited on the regenerable collection surface.

40. (New) The device according to Claim 8, further comprising a particle counter.

41. (New) The device according to Claim 40, where the particle counter is capable of reporting a present value of particle counts in at least one predetermined size range.

42. (New) The device according to Claim 12, wherein the additional component comprises at least one component selected from the group consisting essentially of an adjacently positioned aerosol sampler and an adjacently positioned aerosol analyzer.

43. (New) The device according to Claim 1, further comprising a particle counter.

44. (New) The device according to Claim 43, where the particle counter is capable of reporting a present value of particle counts in at least one predetermined size range.

45. (New) The device according to Claim 35, wherein the additional component comprises at least one component selected from the group consisting essentially of an adjacently positioned aerosol sampler and an adjacently positioned aerosol analyzer.